

LB/DON /82 /07

82.

A STUDY ON SOFTWARE PRODUCT DEVELOPMENT APPROACHES IN THE SRI LANKAN SOFTWARE INDUSTRY

By

V.Manoharan

LIBRARY
UNIVERSITY OF MORATUWA, SRI LANKA
MORATUWA

The Dissertation was submitted to the Department of Management of Technology/ Computer Science & Engineering of the University of Moratuwa in partial fulfillment of the requirement for the Degree of Master of Business Administration.

65"05"
62:65(043)

TH

Department of Management of Technology

University of Moratuwa

November 2005

University of Moratuwa




87874

67874

87874

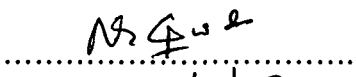
DECLARATION

“I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any University to the best of my knowledge and belief it does not contain any material previously published, written or orally communicated by another person or myself except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and for interlibrary loans, and for the title and summary to be made available to outside organizations”


Signature of the Candidate

24/01/2007
Date

To the best of my knowledge, the above particulars are correct.


Supervisor 24/01/07

Abstract

Software product development today cannot be regarded as generally successful. Only about one of four software development projects is completed on time and on budget, with all features and functions originally specified (*Christina Wallin, 2005*). There are a number of software development models followed by the software companies. But all the available software development life cycle models cater to customized software development. They cater to the development of software based on a customer's requirement and used by only that customer. Most software companies are either moving into or already in the product business (Generic Software). The task of developing and implementing software products to support complex business processes on time and within budget has been less than satisfactory for many companies and government agencies implementing major information systems. For many organizations, the likelihood of failure is unacceptably high. This suggests that perhaps the traditional approaches and assumptions used in the software development process are inherently flawed. This dissertation attempts to identify the problem areas in projects involving the implementation of software products in Sri Lanka. The problem areas were identified by conducting a survey for a selected sample of thirty from four software companies. As a solution to some of the problems a recommended approach for projects involving delivery of software products is suggested. The recommended approach covers the inception of a project comprising the implementation of a software product to the point where final acceptance is obtained.

Acknowledgement

Accomplishing a dissertation of this nature is no easy task. The dissertation could be completed if not for the help obtained from various individuals and organization

The writer of this report wishes to express his sincere gratitude to the following people and institutions who helped him in the successful completion of this dissertation.

- Dissertation supervisor Prof. Niranjan Gunawardane for his valuable guidance and advice.
- The University of Moratuwa for giving the writer the opportunity for doing a dissertation of this nature.
- All software professionals and their respective organizations who participated in the fact finding survey and for giving valuable advice.
- Informatics (Pvt.) Ltd., the organization the writer is employed, for their valued support.
- The writers colleagues and subordinates for their support and tolerance.
- The writer's late father and mother for their continued support and encouragement.

Table of Contents

Chapter 1 – Introduction

1.1. Project Background.....	7
1.2. Problem Domain.....	8
1.3. Objectives.....	10
1.4. Importance of the Project	10
1.5. Literature Review	10
1.6. Research Design	11
1.7. Data Collection.....	11
1.8. Facilities & Resources Required.....	12

Chapter 2 – Literature Review

2.1. Introduction.....	13
2.2. Ad-hoc Development.....	13
2.3 The Waterfall Model.....	14
2.3.1 Problems/Challenges Associated with the Waterfall Model.....	16
2.4. Iterative Development.....	16
2.4.1. Problems/Challenges Associated with the Iterative Model.....	18
2.5. Prototyping.....	19
2.5.1. Problems/Challenges Associated with the Prototyping Model	21
2.6. The Exploratory Model.....	21
2.6.1. Problems/Challenges Associated with the Exploratory Model.....	22
2.7. The Spiral Model.....	23
2.7.1. Problems/Challenges Associated with the Spiral Model.....	24
2.8. The Reuse Model.....	24
2.8.1. Problems/Challenges Associated with the Reuse Model.....	26
2.9. Agile Model.....	26
2.9.1. Extreme Programming (XP).....	28
2.9.2. Scrum.....	30
2.9.3. Feature Driven Development (FDD).....	32
2.9.4. Dynamic System Development Method (DSDM).....	33
2.9.5. Adaptive Software Development (ASD).....	35
2.9.6. Problems/Challenges Associated with Agile Model.....	37

Chapter 3 – Methodology & Data Collection

3.1. Introduction.....	41
3.2. Selection of Companies.....	41
3.3 Selection of Sample.....	42
3.4. Selection of Research Tool.....	43
3.5. Collection of Data.....	43
3.6. Analysis of Data.....	44

Chapter 4 – Results of Findings

4.1. Introduction.....	46
4.2. Business Type of the Organization.....	46
4.3. No. of Years in IT Industry.....	47

4.4. No. of Years in Software Product Business.....	47
4.5. No. of Software Products.....	48
4.6. Role of Respondent Sample.....	48
4.7. SDLC Model Followed.....	49
4.10. Problem in Coding.....	51
4.11. Problems in Business Knowledge.....	51
4.12. Problems in Change Management.....	52
4.13. Problems in Communicating Solution to Customer.....	53
4.14. Problems in Process Monitoring.....	54
4.15. Rate of Success Using Current SDLC.....	55
4.16. Need for New Model for Product Development.....	56
4.17. Summary on Findings.....	57

Chapter 5 – Required Approach for Software Product Development

5.1. Introduction.....	58
5.2 Required Approach for Projects Involving Software Products.....	58
5.2.1. Plan.....	61
5.2.2. Business Modeling.....	62
5.2.3. Provisional Acceptance.....	63
5.2.4. Customization (Coding).....	64
5.2.5. Training.....	64
5.2.6. Pilot Test.....	65
5.2.7. Live Run.....	66
5.2.8. Final Acceptance.....	67
5.2.9. Support.....	68
5.3. Team Structure for Software Products.....	68
5.3.1. Product Specialist Unit.....	69
5.3.2. Software Development Unit.....	70
5.3.3. Business Analysts Unit.....	70
5.4. Evaluation.....	71
5.4.1. Suitability of Model.....	71
5.4.2. Suitability of Team Structure.....	72

Chapter 6 – Conclusion and Future Work

6.1. Introduction.....	73
6.2. Conclusion.....	73
6.3. Future Work.....	76

References	79
------------------	----

Appendix A – Questionnaire	83
----------------------------------	----

Appendix B – Role of Design in Software Product Development.....	88
--	----

Appendix C – A Framework for Managing Software Product Development	103
--	-----

Table of Figures

Figure 2.1 Ad-Hoc Development	13
Figure 2.2 Waterfall Model	14
Figure 2.3 Iterative Development	17
Figure 2.4 Spiral Model	23
Figure 2.5 Life Cycle of the XP Process.....	30
Figure 2.6 Scrum Process	31
Figure 2.7 Feature Driven Development Process	32
Figure 2.8 DSDM Process	34
Figure 2.9 ASD Life Cycle	36
Figure 3.1 Problem Area	44
Figure 3.2 Suitability of SDLC	45
Figure 4.1 Business Type of Organization of Sample Respondents.....	46
Figure 4.2 No. of Years in IT Industry.....	47
Figure 4.3 No. of Years in S/W Product Business.....	47
Figure 4.4 No. of S/W Products.....	48
Figure 4.5 Roll of Respondents.....	48
Figure 4.6 SDLC Models Followed for Product Development.....	49
Figure 4.7 Problems in Requirement Gathering.....	50
Figure 4.8 Problems in Designing.....	50
Figure 4.9 Problems in Coding.....	51
Figure 4.10 Problems in Business Knowledge.....	52
Figure 4.11 Problems in Change Management.....	53
Figure 4.12 Problems in Communicating Solution to Customer.....	54
Figure 4.13 Problems in Process Monitoring.....	55
Figure 4.14 Rate of Success Using Current SDLC.....	56
Figure 4.15 Need for New Model	56
Figure 5.1 Model for Software Product Development.....	60
Figure 5.2 Team Structure for Product Development.....	69
Figure 5.3 Suitability of New Model.....	71
Figure 5.4 Suitability of Team Structure.....	72

Acronyms

ASD :- Adaptive Software Development
CD-ROM :- Compact Disk – Read Only Memory
DSDM :- Dynamic System Development Method
FDD:- Feature Driven Development
IT :- Information Technology
JAD :- Joint Application Development
OS:- Operating System
MB :- Mega Bytes
MS :- Microsoft
POS:- Point Of Sale
PLC:- Product Life Cycle
RAM:- Random Access Memory
R & D:- Research & Development
RUP :- Rational Unified Process
SDLC :- Software Development Life Cycle
SLC :- Software Life Cycle
UML :- Unified Modeling Language
XP :- Extreme Programming